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REMARKS

By the present amendment, independent claims 1 and 10 have been amended.

Thus, after the present amendment, claims 1-5, 7-13, 15-18 and 28-31 remain in the present application. Reconsideration and allowance of pending claims 1-5, 7-13, 15-18 and 28-31 in view of the above amendments and following remarks are requested.

Applicants note the statement from the Examiner that previous amendments were not entered because they raised new issues that would require further consideration and/or search. However, Applicants assume that the amendments made to overcome the 35 USC §112, ¶ 1, rejections were entered; as such, these latter amendments are not repeated herein and are treated as if they were entered.

A. Rejections of Claims 1, 7, 10, 15, 28, and 30 under 35 USC §103(a)

The Examiner has rejected claims 1, 7, 10, 15, 28, and 30 under 35 USC §103(a) as being obvious with respect to Lee and Geller. For the reasons discussed below, Applicants respectfully submit that the present invention, as defined by amended independent claims 1 and 10, is patentably distinguishable over Lee and Geller.

Various embodiments according to the present invention relate to a metal resistor that can be advantageously added to a standard aluminum backend process used in IC chip fabrication without impacting or disturbing the aluminum backend process flow. In one embodiment, a standard two-step dielectric deposition process can accommodate the patterning of the metal resistor on a first intermetallic dielectric layer followed by

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depositing a second intermetallic dielectric layer over the metal resistor. Additionally, the present novel scheme of accommodating the standard two-step dielectric deposition to integrate the metal resistor between two adjacent (i.e. sequential) interconnect metal layers does not significantly increase via etch depth, and thus advantageously results in a simplified via etch process.

Claims 1 and 10 have been amended in order to further illustrate aspects of the present invention. Amended independent claims 1 and 10 recite, in part, "a metal resistor situated over said first intermetallic dielectric layer, said metal resistor being only connected to a second interconnect metal layer . . . said second interconnect metal layer over said second intermetallic dielectric layer, wherein said first and second interconnect metal layers are adjacent to each other."

In contrast to the present invention as defined by amended independent claims 1 and 10, Lee is directed to a reduced-cost method of manufacturing a thin film resistor layer exhibiting efficient electrical operation. A first insulating layer is formed on a substrate. A thin film resistor layer is formed on the first insulating layer. A second insulating layer is formed on the thin film resistor layer. The Examiner acknowledges that Lee does not disclose a first interconnect metal layer.

Furthermore, Lee does not disclose, teach, or even suggest first and second interconnect metal layers adjacent to each other. Lee likewise does not teach the advantages inherent in the claimed configuration.

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Lee does not disclose, teach, or suggest the configuration of amended independent claims 1 and 10. Furthermore, there is no teaching or suggestion to combine or modify Lee. Therefore, Lee, singly or in combination with other art of record, does not disclose, teach, or suggest the present invention as defined by amended independent claims 1 and 10.

Geller fails to cure the deficiencies of Lee. Geller relates to an electronic integrated circuit (IC) that includes at least one of radio frequency, microwave, digital, and analog components connected in a desired circuit. The IC includes a substrate of a conductive material having on a surface thereof a body of a dielectric material formed from a plurality of dielectric layers. A plurality of strips of a conductive material is situated on the surfaces of the layers of the body to form RF, analog, and digital components.

The Examiner states that Geller teaches first interconnect metal layer 22 under first intermetallic dielectric layer 30 and resistor 46. However, Applicants respectfully submit that Geller in fact merely teaches metal strip 22, dielectric material 30, and strip 46. See, for example, Geller at Figure 1 and column 2, line 45. Moreover, Geller does not disclose, teach, or even suggest first and second interconnect metal layers adjacent to each other and a metal resistor situated between the first and second interconnect metal layers. Geller further does not teach the advantages inherent in the claimed configuration.

Geller does not disclose, teach, or even suggest the configuration of amended independent claims 1 and 10. Furthermore, there is no teaching or suggestion to combine

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or modify Geller. Therefore, Geller, singly or in combination with other art of record, does not disclose, teach, or suggest the present invention as defined by amended independent claims 1 and 10.

B. Rejections of Claims 2-5, 8, 9, 11-13, and 16-18 under 35 USC §103(a)

The Examiner has rejected claims 2-5, 8, 9, 11-13, and 16-18 under 35 USC §103(a) as being obvious with respect to Lee, Geller, and U.S. Patent Number 6,627,539 to Zhao, et al. ("Zhao"). Applicants respectfully submit that claims 2-5, 8, 9, 11-13, and 16-18 depend from amended independent claims 1 and 10, respectively, and thus, claims 2-5, 8, 9, 11-13, and 16-18 should be allowed at least for the same reasons discussed above in conjunction with patentability of amended independent claims 1 and 10.

C. Rejections of Claims 29 and 31 under 35 USC §103(a)

The Examiner has rejected claims 29 and 31 under 35 USC §103(a) as being obvious with respect to Lee, Geller, and U.S. Patent Number 5,422,307 to Ishii ("Ishii"). Applicants respectfully submit that claims 29 and 31 depend from amended independent claims 1 and 10, respectively, and thus, claims 29 and 31 should be allowed at least for the same reasons discussed above in conjunction with patentability of amended independent claims 1 and 10.

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D. Conclusion


Based on the foregoing reasons, the present invention, as defined by amended independent claims 1 and 10 and claims depending therefrom, is patentably distinguishable over the art cited by the Examiner. As such, and for all the foregoing reasons, an early Notice of Allowance directed to all claims 1-5, 7-13, 15-18, and 28-31 remaining in the present application is respectfully requested.

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Respectfully Submitted,
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